5.9 NOISE

This section presents an assessment of potential noise impacts related to the Palomar Energy Project proposed for a site located in Escondido, California. This assessment includes an evaluation of the potential effects on noise-sensitive receptors (in this case, residences in the site vicinity) and on plant operations personnel. In accordance with CEC guidelines, a comprehensive survey of background noise levels was conducted as part of this assessment.

5.9.1 Affected Environment

CEC guidelines for noise impact analysis require identification of those land uses near a project site where quiet is an important attribute of those uses. Such land uses are considered noise-sensitive receptors. The sensitive receptors nearest to the Palomar project site are a mobile home park to the southeast and single-family residences to the west and southwest, as shown on Figure 5.9-1. There are no other sensitive receptors near the project site, such as schools, hospitals, libraries, places of worship, etc.

The distance between the location of the Palomar project's primary noise-generating equipment and the nearest single-family residences to the west is approximately 1,800 feet. These residences are well shielded by irregular terrain, and there would be no line of sight between these residences and any portion of the power plant. Several single-family residences located on elevated lots to the southwest, although further from the project site at a distance of 2,300 feet, are not as well shielded by terrain and would have a line of sight with an upper portion of the power plant exhaust stacks. The distance from the Palomar site to the nearest mobile homes to the southeast is approximately 2,800 feet. The mobile homes are partially shielded from the project site by intervening industrial buildings.

The Palomar project's reclaimed water supply and brine return pipelines will be constructed along a route that is partly within the planned Escondido Research and Technology Center (ERTC) industrial park in which the project site is located, and partly within the right-of-way of Harmony Grove Road. There are no residences or other sensitive receptors adjacent to the water pipeline route. A gas pipeline upgrade extending 2600 feet would be constructed by SDG&E along a route that is entirely within the rights-of-way of Lincoln Avenue and Metcalf Street. There are residences, but no other sensitive receptors, adjacent to a portion of the gas pipeline upgrade route.

5.9.1.1 Ambient Noise Monitoring Survey

CEC guidelines define the zone of potential noise impact as that area where noise levels may be increased by 5 decibels above existing background levels. In order to define this zone of potential impact, ambient noise levels were measured at the four locations shown in Figure 5.9-1. In accordance with CEC guidelines, measurements were made for 25+ continuous hours at all four locations. At each location, metering equipment secured in a locked box was positioned about five feet above the ground.

Figure 5.9-1 Surrounding Land Uses and Noise Measurement Locations

The four noise measurement locations are described as follows:

- Location 1: Single-family residences along Live Oak Road, Chardonney Way, and Allenwood Lane west of the project site. The metering equipment was placed in a tree approximately 100 feet east-southeast of the guardrail marking the east end of Live Oak Road. Ambient levels were monitored from April 23 to 25, 2001.
- Location 2: Single-family residences located on elevated lots along Oak View Way southwest of the project site. The metering equipment was placed on a power pole near the Oak View Way/Kona Kai Lane intersection, near the highest point of residential occupancy relative to the elevation of the proposed project. Ambient levels were monitored from September 24 to 25, 2001.
- Location 3: Mobile homes along Via Chardonnay southeast of the project site. The metering equipment was placed above a block wall that divides the west side of the mobile home park from industrial buildings that take access from Andreasen Drive. Ambient levels were monitored from April 23 to 25, 2001.
- Location 4: Existing industrial land uses adjacent to the east boundary of the project site. These existing uses take access from the cul-de-sac at the west end of Aldergrove Avenue. The metering equipment was placed at the west side of a parking lot adjacent to the east boundary of the project site. Ambient levels were monitored from April 23 to 25, 2001.

During the April 23 to 25, 2001 noise monitoring period, the weather was fair and mild. Although relative humidity declined in response to the development of a mild "Santa Ana" condition on April 25, winds were weak to moderate (<10 mph) throughout the measurement period, and thus wind noise did not interfere with the noise monitoring. During the September 24 to 25, 2001 noise monitoring period, the weather was characterized by warm daytime temperatures (>90ºF), low humidity (<50 percent), and a mild offshore wind condition.

The ambient noise level monitoring results are summarized in Table 5.9-1. The noise levels are expressed in terms of dBA, which incorporates a weighting of sound levels to reflect the sensitivities of human hearing (i.e., less sensitive at low and extremely high frequencies than at mid-range frequencies). The table provides 1-hour noise levels for the hours during which the peak, second highest, and minimum noise levels were measured. These 1-hour noise levels are expressed in terms of L_{EQ}, the average noise level measured over the 1-hour period. Other statistics provided by the table include the 1-second maximum, 1-second minimum, 10^{th} percentile, 50^{th} percentile, and 90^{th} percentile noise levels.

For each location, the minimum 1-hour noise level (i.e., the noise level measured during the quietest hour of the monitoring period) is taken to be the “background” level. The ambient noise levels are characterized as follows:

- Location 1: Single-family residences west of the project site. Background levels are lowest at this location, as intervening terrain substantially shields this location from freeway and arterial roadway noise. The minimum 1-hour level was 36 dBA L_{EQ}, and noise levels generally were in the range of 40 to 50 dBA L_{EQ}.
- Location 2: Single-family residences located on elevated lots southwest of the project site. Background levels are higher than at Location 1, as Location 2 is not as well shielded by intervening terrain. The minimum 1-hour level was 40 dBA L_{EQ}, and noise levels were mostly in the range of 45 to 50 dBA L_{EQ}.
- Location 3: Mobile homes southeast of the project site. This location receives some spillover noise from adjacent industrial uses. The minimum 1-hour level was 45 dBA L_{EQ}, and noise levels generally were in the range of 45 to 55 dBA L_{EQ}.
- Location 4: Existing industrial land uses adjacent to the east boundary of the project site. The minimum 1-hour level was 50 dBA L_{EQ}, and noise levels generally were in the range of 50 to 60 dBA L_{EQ}.

Table 5.9-1 Ambient Noise Monitoring Summary (dBA) [1]

	Location 1 SFRs to W		Location 2 SFRs to SW		Location 3 MHP to SE		Location 4 Industrial to E	
	Hours 01-24	Hours 25-48	Hours 01-24	Hours 25-48	Hours 01-24	Hours 25-48	Hours 01-24	Hours 25-48
Peak 1-hour level (L_{EQ}) [2]	55 [4]	51	57	56	58	57	59	59
Hour recorded [3]	05-06	05-06	06-07	08-09	06-07	11-12	08-09	07-08
2nd highest 1-hour level (L_{EQ}) [2]	49	49	56	55	57	56	58	58
Hour(s) recorded [3]	16-17	06-08	05	06	07-08	05-07	06-08	05-07
Minimum 1-hour level (L_{EQ}) [2]	36	40	40	40	45	45	50	51
Hour(s) recorded [3]	22-23	09-10	14-15	10-11	18-19	01-02	22-23	11-12
1-second maximum	72	70	74	76	71	74	78	82
1-second minimum	30 [5]	30 [5]	30 [5]	30 [5]	34	36	40	40
10th percentile (L_{10})	45	46	51	49	52	52	55	56
50th percentile (L_{50})	41	42	46	46	48	47	50	52
90th percentile (L_{90})	37	38	44	42	46	44	48	49

[1] dBA incorporates a weighting of sound levels to reflect the sensitivities of human hearing.
[2] L_{EQ} is the average noise level measured over the 1-hour period.
[3] Locations 1, 3, 4: Hour 00-01 is Midnight to 1 a.m. on 4/24/01; Hour 47-48 is 11 p.m. to Midnight on 4/25/01.
[3] Location 2: Hour 00-01 is Midnight to 1 a.m. on 9/24/01; Hour 47-48 is 11 p.m. to Midnight on 9/25/01.
[4] Possibly noise from water sprinklers.
[5] Level could be lower, meter noise "floor" is about 30 dB.

5.9.1.2 City of Escondido Noise Standards

Noise standards adopted by the City of Escondido are relevant to the Palomar Energy Project. The City of Escondido Noise Ordinance limits the noise that is created by an activity and is

audible at an offsite property. Allowable offsite noise levels vary according to the land use of the receiving property, as shown in Table 5.9-2.

Table 5.9-2 City of Escondido Noise Standards (dBA L_{EQ}) [1]

Land Use	7 a.m. to 10 p.m.	10 p.m. to 7 a. m.
Single Family Residences	50	45
Multi-family Residences	55	50
Commercial	60	55
Light Industrial and Industrial Park	70	70
General Industrial	75	75

[1] dBA incorporates a weighting of sound levels to reflect the sensitivities of human hearing. Average noise levels are measured over a 1-hour period.

The Noise Ordinance includes a provision that if the ambient background level exceeds the applicable standard shown in Table 5.9-2, then the background level itself becomes the revised standard. The Noise Ordinance includes a further provision that "in the event the alleged offensive noise, as judged by the enforcement officer, contains a steady, audible sound such as a whine, screech or hum, or contains a repetitive impulsive noise such as hammering or riveting, the standard limits set forth in [Table 5.9-2] shall be reduced by 10 dB or to the ambient noise level when such noises are not occurring". As discussed in Section 5.9.2.2, the Palomar plant's loudest noise sources have fairly broad band characteristics (i.e., "white noise") without very specific tone dominance (i.e., the noise is "atonal"). The combination of all of the plant's noise sources is multi-spectral without a very strong frequency peak. As a result, while noise from a power plant with appropriate noise attenuation measures may still be distinguishable (depending upon the receptor location), it is not expected to be perceived as an offensive whine, screech, hum, or hammering.

5.9.2 Environmental Impacts

The significance of noise impacts is directly related to the increase in noise levels over ambient background levels at sensitive receptors. If the offsite noise level resulting from an activity is near background conditions, noise from the activity will be masked by the background. If the offsite noise level resulting from an activity exceeds the background by a substantial amount, it may be intrusive. Consistent with noise assessment guidelines in a number of jurisdictions, an increase of 5 dBA over ambient background levels at sensitive receptors is considered significant.

Based on the ambient noise monitoring data and City of Escondido noise standards presented in Section 5.9.1, the zone of noise impact sensitivity that surrounds the Palomar site is asymmetrical:

- At the single-family residences to the west, the significance threshold is 41 dBA L_{EQ} (5 dBA over the ambient minimum 1-hour level of 36 dBA). This threshold is more stringent than the 10 p.m. to 7 a.m. City of Escondido noise standard of 45 dBA L_{EQ}.
- At the single-family residences to the southwest, the significance threshold is 45 dBA L_{EQ} (5 dBA over the ambient minimum 1-hour level of 40 dBA, which also equals the City of Escondido nocturnal noise standard).
- At the mobile home park to the southeast, the significance threshold is 45 dBA L_{EQ} (the 10 p.m. to 7 a.m. City of Escondido noise standard). This threshold is more stringent than the 50 dBA L_{EQ} that would result from adding 5 dBA to the ambient minimum 1-hour level of 45 dBA.
- At the existing industrial land uses adjacent to the east boundary of the project site, the significance threshold is 70 dBA L_{EQ} (the 10 p.m. to 7 a.m. City of Escondido noise standard for industrial properties). As this location is not a sensitive receptor, the "5 dBA over ambient" guideline does not apply.

5.9.2.1 Construction Impacts

Construction noise will be temporarily audible outside the boundaries of the construction site. The most substantial sources of construction noise are impulsive sources, such as pile drivers or hydraulic rams, heavy tracked earthmoving equipment such as dozers and backhoes, and single-event phenomena, such as blasting. Noise emissions associated with site preparation activities such as rough grading and blasting, will occur as part of development activities of the ERTC industrial park, before Palomar plant construction begins. Palomar project construction noise will derive from final site grading, underground utility excavation, foundation and footings excavation and installation, and structural assembly and installation of power plant equipment and facilities. There also will be noise emissions associated with the offsite installation of project water supply and brine return pipelines, as well as with the upgrading of a 2,600-foot segment of natural gas pipeline in central Escondido.

City of Escondido requirements limit the hours of heavy equipment operations to weekday/daytime hours of lesser sensitivity except in an emergency, or for actions in the public good such as nighttime roadway construction to retain daytime roadway capacity. The normally acceptable hours for heavy equipment use in the City if Escondido are 7 a.m. to 6 p.m. Monday through Friday, and 8 a.m. to 5 p.m. on Saturday. Because offsite construction activities would not occur within rights-of-way of heavily traveled roadways, it is unlikely that nighttime roadway construction will be necessary.

Because construction activities are temporary and confined to hours of least noise sensitivity, the noise performance standards applied to chronic sources do not apply to construction. San Diego County's noise ordinance has a performance standard of 75 dBA L_{EQ} averaged over 8 hours at the nearest residential property line. Although the City of Escondido has not adopted

this standard, it was used as a frame of reference to evaluate the noise exposure at any noise-sensitive uses.

Power Plant Construction Noise

Maximum project construction-related construction noise emissions are expected to occur at a time when a both earthmoving (e.g., utility or foundation/footing installation) and the initial assembly of the heaviest power plant superstructure support members are ongoing. A variety of noise sources would be operating, including heavy equipment (e.g., trencher, grader, loader, backhoe, and cranes), welding machines, air compressors, and trucks. Table 5.9-3 shows the sources assumed to represent the total operating equipment fleet for an entire day during this peak construction noise period, along with the reference noise level at 50 feet from the source.

Table 5.9-3 Construction Equipment Used during Peak Noise Period

Heavy Equipment (3)	85 dBA
Air Compressors (2)	84 dBA
Welders (2)	67 dBA
Concrete Truck (1)	71 dBA
Miscellaneous Trucks (3)	65 dBA
COMBINED NOISE LEVEL @ 50'	**88 dBA**

Source: Mountainview Power Company, LLC, 2000; EPA, 1971.

Using the normal geometrical spreading of sound waves in a direct line of sight, noise levels decay at a rate of 6 dB for each doubling of distance. Table 5.9-4 shows the estimated peak construction daily noise levels at various distances from the center of the facility's power block, which is assumed to be the centroid of construction noise generation. These predicted noise levels incorporate no attenuation due to irregular terrain, atmospheric absorption or equipment idling during on/off use cycles.

Table 5.9-4 Peak Construction Noise at Varying Distances from Project Noise Centroid (Worst Case) [1]

50 feet	88 dBA
100 feet	82 dBA
200 feet	76 dBA
225 feet	75 dBA (San Diego County threshold)
245 feet	74 dBA (site boundary)

400 feet	70 dBA
800 feet	64 dBA
1,800 feet	57 dBA (residences to west of site)
2,300 feet	55 dBA (residences to southwest of site)
2,800 feet	53 dBA (mobile homes to southeast of site)

[1] Does not include atmospheric absorption, terrain/structural interference, or equipment idling.

As shown in Table 5, 9-4, San Diego County's 75 dBA L_{EQ} standard will be met at 225 feet from the centroid of the construction noise source. Noise exposures at the nearest residences would be in the mid-50 dBA range, under assumptions of direct source-to-receiver propagation with no line-of-sight interference due to structures or variable terrain. Interruption of line of sight by variable terrain and moving equipment can reduce noise levels by from 5 to 20 dBA, typically averaging 10-15 dBA With noise level reductions due to interference and atmospheric absorption, the equipment noise will be in the 40-50 dBA L_{EQ} range. Such levels are similar to daytime background levels observed at the nearest residences.

Construction equipment noise tends to be fairly "broadband" without prominent tones. The typical "true" sound-frequency characteristics of a typical fleet of power plant construction equipment, along with the frequency range normally heard by people, is provided in Table 5.9-5. Although construction equipment engines have considerable acoustic energy in lower frequencies, human hearing is less sensitive in those ranges. The A-weighted (human response) equipment noise spectrum is seen to be "flat" (broadband) without dominant frequencies.

Table 5.9-5 Typical Heavy Construction Fleet Sound Frequency Characteristics Octave Band (Hz) Sound Levels At 50 Feet

Noise Source	63	125	250	500	1,000	2,000	4,000
Actually Generated (dB)	101	97	88	84	84	78	73
Human Perception (dBA) [1]	75	81	79	81	84	79	74

[1] dBA incorporates a weighting of sound levels to reflect the sensitivities of human hearing.

Source: BBN, 1977 ("Power Plant Construction Noise Guide")

Pipeline Construction Noise

Pipeline construction is not only a temporary source, but activities would occur at any given location only for a few days before the process of excavation, bedding, placement and backfill are completed and the activities move to another location. Several pieces of heavy equipment (e.g., excavator, dump truck and small crane) would be utilized. These equipment items generate 75-82 dBA L_{EQ} at 50 feet during typical operation (Hoover and Keith, 1981). The reference noise level for all three sources under continuous power thus is estimated at 83 dBA $L_{EQ.}$ Intermittent operations and progressive movement of activities would reduce the 8-hour noise exposure at any individual receiver site.

Noise measurements during excavation for a major water pipeline in southern California indicated 8-hour noise levels at 50 feet of 79 dBA L_{EQ} (San Dieguito Water District, 2001). Noise measurements during pipe laying (trench bedding, pipe laying with a crane, seam welding and inspection and backfill placement/compaction) at this same project were 74 dBA L_{EQ} at 50 feet. The 75 dBA L_{EQ} 8-hour noise impact threshold during this water pipeline project extended to 80 feet from the pipeline trench. The Palomar Energy Project water supply, brine return, and natural gas pipelines are much smaller in diameter than the water pipeline where noise levels were measured. The 75 dBA L_{EQ} construction noise "footprint" from Palomar pipeline installation likely would be less than 80 feet because somewhat smaller (with less powerful engines and thus somewhat less noisy) equipment would be used.

Portions of the water supply/wastewater return pipeline route and the natural gas upgrade route would be installed within existing roadways in urban residential areas**.** Daytime noise levels in these urbanized areas are estimated at 55-60 dBA. Noise levels greater than 5 dBA above ambient would be experienced in the urban areas immediately adjacent to the pipeline construction work. However, pipeline construction is a progressive activity that would only affect a given receptor for a few days. Because of the temporary nature of the exposures, pipeline construction noise impacts are not considered significant.

Construction Worker Noise Exposure

Compliance with CalOSHA regulations requires that construction personnel be adequately protected from noise hazards. The worker exposure noise limit is 90 dBA over an 8-hour

work shift. If noise exposure exceeds 85 dBA, the area must be posted as a noise hazard area, and a hearing conservation program must be implemented.

As shown on Table 5.9-3, areas of the construction site, particularly near where the heavy equipment is operating, will experience noise levels near 90 dBA. A hearing conservation will be required. Hearing protection during construction is the responsibility of the contractor/employer. Palomar Energy Project health and safety requirements for project and contractor personnel will ensure that these exposure standards are met.

5.9.2.2 Operational Impacts

Power plant operational noise emanates from a variety of sources, including the combustion of fuel in the two combustion turbines, the flow of air through the combustion turbine inlet and exhaust ducts, the flow of steam through the two heat recovery steam generators (HRSGs) and steam turbine, the flow of air and water through the cooling tower, and the operation of various plant auxiliary systems. Noise attenuation measures are incorporated into the design of the Palomar plant in order to minimize both onsite and offsite noise levels.

Noise Sources and Onsite Noise Levels

Table 5.9-6 presents noise level data for the individual major components of the Palomar plant. Based on this data, and accounting for the shielding that is inherent in the plant layout (i.e., one plant component interrupting the line of sight to another plant component), the overall noise level is estimated at 77 dBA L_{EQ} at 100 feet from the noise centroid of the plant. The approximate location of the noise centroid is midway between the inlet transition ducts of the two HRSGs (i.e., midway between the exhaust ducts of the two combustion turbines).

Table 5.9-6 Noise Levels for Major Components of the Power Plant

Component	Number of Units	Noise Level per Unit at 100 feet (dBA)
GE 7FA Combustion Turbine Generators[1]	2	74
Steam Turbine[2]	1	72
HRSG Inlet Transition Ducts	2	67
HRSG	2	67
HRSG Exhaust Stacks[3]	2	56
Main Step-Up Transformers	3	66
Cooling Tower	1	70
Boiler Feed Pumps	4	64
Condensate Pumps	3	60

[1] with 85 dBA near-field noise attenuation package.
[2] with 90 dBA near-field noise attenuation package.
[3] with exhaust stack silencers that reduce noise level from 69 dBA to 56 dBA at 100 feet.
Source: Burns & McDonnell

The power plant's loudest noise sources are the combustion turbines and steam turbine. These sources have fairly broad band characteristics (i.e., "white noise") without very specific tone dominance (i.e., the noise is "atonal"). These sources also have a very strong low frequency dominance, but the human ear does not hear low frequencies very well. Table 5.9-7 presents the frequency characteristics of the combustion turbines and steam turbine.

Table 5.9-7 Turbine Frequency Characteristics – Octave Band Center Frequency (Hz)

Source	31.5	63	125	250	500	1000	2000	4000	8000	Total
Unweighted Noise Level (dB)										
Gas Turbine[1]	113	114	110	107	105	103	106	101	95	118
Steam Turbine[2]	112	112	109	107	110	107	104	101	100	118
A-Weighted Human Hearing Noise Level (dBA)										
Gas Turbine[1]	74	88	94	98	102	103	107	102	94	111
Steam Turbine[2]	73	86	93	98	107	107	105	102	99	111

[1] with 85 dBA near-field noise attenuation package.
[2] with 90 dBA near-field noise attenuation package.

The combustion turbines produce unweighted maximum sound at 63 Hz, but the A-weighted human ear response shifts the apparent loudest octave band to 2000 Hz. Similarly, the steam turbine produces unweighted maximum sound at 31.5 to 63 Hz, but the A-weighted apparent maximum is at 500 to 1000 Hz.

Offsite Noise Levels

In addition to the attenuation due to measures incorporated into the design of the power plant, offsite noise levels are subject to further attenuation due to distance, atmospheric absorption, intervening structures, and intervening terrain.

- Distance – Based on the normal geometrical spreading of sound waves in a direct line of sight, noise levels decay at a rate of 6 dB for each doubling of distance.
- Atmospheric absorption – Attenuation due to atmospheric absorption results from imperfect collisions between air molecules transmitting the sound.
- Intervening structures – Attenuation from a solid barrier can be as high as 20 dB, while partial barriers with intervening gaps may result in only a 3 dB reduction. The attenuating effect of structures is of significance primarily for receptors to the east and southeast of the plant site. The 220-ft long, 25-ft high operations building has been placed along the east boundary of the site as a partial barrier separating the power block from receptors to the east and southeast. In addition, a number of offsite industrial buildings separate the project site from the mobile home park to the southeast.

- Intervening terrain – Attenuation may be calculated for the path length difference between a direct sound wave versus one refracted around intervening terrain. A detailed noise attenuation calculation was performed for the major noise producing components of the power plant. The noise emission heights range from 750 feet amsl for equipment located at grade to 860 feet amsl for the top of the HRSG exhaust stacks. Intervening terrain ranges from 800 to 830 feet amsl immediately west of the power block, and 760 to 800 feet amsl immediately east of the power block. In addition, a large berm is included in the design of the buffer area that separates the west edge of the planned industrial park from the single-family residences to the west and southwest. There would be no line of sight between the residences to the west and any portion of the power plant. Several residences located on elevated lots to the southwest would have a line of sight with an upper portion of the HRSG exhaust stacks. Calculations were performed for the single-family residences to the west and southwest of the plant site, for the mobile home park to the southeast, and for the nearest existing industrial land uses to the east.

Table 5.9-8 presents the results of the analysis of offsite noise levels. A comparison is provided with the significance threshold for each location, and the results show that the thresholds are not exceeded.

Table 5.9-8 Results of Analysis of Offsite Noise Levels (dBA L_{EQ})

Location	Distance Attenuation		Other Attenuation			Attenuated Noise Level [1]	Significance Threshold
	Distance	Noise Level	Atmospheric Absorption	Intervening Structures	Intervening Terrain		
Onsite	100 ft	77	--	--	--	77	--
Industrial Land Uses to the East	245 ft	69	0	5	0	64	70
Single-Family Residences to the West	1,800 ft	52	4	0	18	30	41
Single-Family Residences to the Southwest	2,300 ft	50	4	0	9	37	45
Mobile Homes to the Southeast	2,800 ft	48	5	10	0	33	45

[1] Varies with individual noise sources within the facility; values shown are averages for the entire facility.

Worker Noise Exposure During Operations

The noise attenuation measures incorporated the design of the Palomar plant in order to minimize offsite noise levels will also limit onsite worker noise exposure during operations. For example, the combustion turbines, steam turbine, and other plant equipment will incorporate the noise attenuation measures indicated in Table 5.9-6. However, some locations within the plant may have noise levels that exceed 85 dBA. Worker protection measures such as posted warning signs in high noise level areas, use of earplugs and earmuffs, and periodic hearing tests are typically included in hearing conservation programs implemented at power plants when noise levels in work areas exceed 85 dBA.

Transmission Line and Switchyard Noise Impacts

Noise impacts from a power generation facility can occur away from the plant site as the result of new switchyards and new transmission lines. The proposed onsite switchyard has been included in the noise analysis, and no new offsite switchyards are required to serve the Palomar project. No new transmission lines are required, since the Palomar project will tie into the existing transmission lines adjacent to the plant site. The "hiss" associated with transmission lines is caused by a corona discharge effect related to transmission line voltage, and the project will not change the existing voltage.

5.9.3 Mitigation Measures

The following measures will ensure that noise impacts are not significant.

5.9.3.1 Construction

NOISE-1 Conduct construction operations involving the use of heavy equipment during hours normally allowed by the City of Escondido Noise Ordinance.

NOISE-2 Maintain all equipment noise-control systems (mufflers and silencers) in good working order in accordance with manufacturer's specifications.

NOISE-3 Post warning signs in high noise level areas. Implement a hearing protection program if noise levels in work areas exceed 85 dBA.

5.9.3.2 Operations

NOISE-4 Incorporate noise attenuation measures into the design of the power plant, including the GE Power Systems 85 dBA noise attenuation package for the combustion turbines, the 90 dBA noise attenuation package for the steam turbine, and exhaust stack silencers that reduce noise from the stacks to a level of 56 dBA or less at 100 feet.

NOISE-5 Limit the use of noise producing signals (horns, whistles, bells, alarms, etc.) to safety warning purposes only. Use hand-held devices rather than public address systems for worker communication.

NOISE-6 Post warning signs in high noise level areas. Implement a hearing protection program if noise levels in work areas exceed 85 dBA.

5.9.4 Significant Unavoidable Adverse Impacts

With implementation of the above mitigation measures, construction and operation of the Palomar Energy Project will not result in significant adverse noise impacts.

5.9.5 Cumulative Impacts

The projects included in the cumulative impact assessment are two small, peaking power plants under construction near the Palomar project site, and the Escondido Research and Technology Center (ERTC) industrial park within the boundaries of which the Palomar project site is located.

The 44 MW RAMCO plant is located about 0.5 mile northwest of the Palomar site, and the 49 MW CalPeak plant is located adjacent to the northern boundary of the Palomar site. Both of these plants will be in operation well before construction begins on the Palomar project, and as a result there will be no cumulative construction impacts. However, concurrent operation is expected to occur on a routine basis. Because of the logarithmic nature of the decibel scale, cumulative effects are immeasurably small when noise levels from two sources differ by 10 dB or more. This means that incremental noise levels from the CalPeak or RAMCO plants in the range of 40 to 50 dB will be undetectable near the Palomar facility. Similarly, near either the CalPeak or RAMCO plant, noise from the Palomar facility will be masked by the noise from the nearby plant. Significant cumulative noise impacts among the three power plants are not expected, given the distance separation between the sources, as well as the terrain and structural screening that will tend to confine noise to the proximity of each source.

The following paragraphs discuss the potential cumulative effects of the Palomar project together with the ERTC industrial park within which the Palomar site is located.

Overall ERTC Industrial Park Construction

The Palomar project will be located within the boundaries of the ERTC industrial park project, and construction activities in other portions of the industrial park could overlap with Palomar construction. The area of potential noise impact would be at the residences west of the industrial park site. However, the Palomar site is located in a portion of the industrial park that is most distant from the residences, and the remaining portion of the industrial park is much larger and much closer to the residences. As a result, construction activities in this remaining, majority portion of the ERTC industrial park would be a greater contributor to cumulative noise levels than would construction of the Palomar facilities.

Planning Area 1 Construction Phase Earthwork

Earthwork to prepare the graded pads for the ERTC industrial park will be performed as an integrated operation, with earth materials removed from Planning Area 1 (the proposed Palomar site) used as fill material in other planning areas. This earthwork will involve heavy earthmoving equipment (e.g., dozers, graders, excavators), support equipment (e.g., scrapers, rollers), and dump trucks. As shown on Table 5.9-9, these activities in Planning Area 1 would produce a combined noise level of 88 dBA_{LEQ} at a distance of 50 feet. As shown on Table 5.9-3, these peak noise levels of 88_{LEQ} are the same as would be expected from power plant construction. As discussed in Section 5.9.2.1, such noise levels generated in Planning Area 1 would result in noise levels in the area of potential impact, the residences west of the industrial park, in the 40 to 50 dBA_{LEQ} range. These are similar to ambient daytime noise levels in these areas. Moreover, as discussed above, the earthwork in the other areas of the industrial park would be a larger contributor to potential cumulative noise impacts at the residences west of the industrial park than would the Planning Area 1 earthwork, because the other areas of the industrial park are much closer to these residences.

Table 5.9-9 Peak Noise Levels from Planning Area 1 Earthwork

Equipment	Noise Levels @ 50 Feet
Heavy Equipment (dozers, graders, excavators)	88dBA
Support Equipment (loaders, scrapers, rollers)	85 dBA
Trucks (dump trucks, water truck)	82 dBA
COMBINED NOISE LEVEL @ 50'[1]	**88 dBA**

[1] Assumes maximum of 3 pieces of equipment operating concurrently within 100 feet of each other.

The earthwork in Planning Area 1 also would involve in-situ blasting to pulverize the granite material in order to render it suitable for use as fill material. Blasting would be expected to occur once daily over a 2 to 3-month period. The blast is designed to remain subsurface and only generate shock waves to fracture the rock in the immediate vicinity of the charge without ejecting material from the ground surface. Controlled blasting performed according to typical professional standards produces only a momentary dull "thump". The appropriate City and Fire Department blasting regulations (including notice requirements) will be followed.

ERTC Industrial Park Operations

Cumulative operational noise impacts from the Palomar facility together with other areas of the ERTC industrial park are expected to be minimal. Industrial park noise generation will be primarily from vehicular sources. Daytime industrial park traffic will increase background noise and mask power plant noise levels. The lack of cumulative interaction at night during low background noise conditions may make the plant more audible than during the daytime.

Industrial park vehicular activity will thus tend to reduce power plant noise perceptibility, rather than causing any significant cumulative impacts.

5.9.6 LORS Compliance

Design, construction, and operation of the Palomar project will be conducted in accordance with all laws, ordinances, regulations, and standards (LORS) pertinent to noise impacts from the project. The applicable LORS are discussed in Section 6.4-9.

5.9.7 Involved Agencies and Agency Contacts

The local agency involved in noise issues relating to the Palomar Energy Project is the City of Escondido. Contact information is provided in Table 5.9-10.

5.9.8 Permits Required and Permit Schedule

No permits are required that are specific to noise issues.

Table 5.9-10 Involved Agencies and Agency Contacts

Agency/Address	Contact/Phone	Permits/Reason for Involvement
City of Escondido Planning Department, 201 North Broadway, Escondido, CA 92029	Susan Oliver, Code Enforcement Manager, (760) 741-4671	City Noise Ordinance

5.9.9 References

City of Escondido. 1990. Municipal Code, Article XII.

General Electric Co. 2001. Power Plant Engineering. 7FA Turbine Noise Data.

Hoover and Keith. 1981. Noise Control for Buildings, Manufacturing Plants, Equipment, and Products.

Mountainview Power Company, LLC. 2000. Application for Certification, Mountainview Power Plant.

Rottinghaus, S., July 2001. Personal Communication (discussion with H. Giroux, Giroux & Associates). Burns & McDonnell.

San Dieguito Water District. 2000. Lake Hodges Flume Replacement Noise Study. February 2000.